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Owner's Manual

SmartOnline™ 3-Phase 20kVA & 30kVA Intelligent True On-Line UPS Systems

Input/Output Voltage: 120/208V AC, 3ø, 4 wire (plus ground), wye

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TRIPP·LITE
POWER PROTECTION

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1. Important Safety Warnings

SAVE THESE INSTRUCTIONS. This manual contains important instructions and warnings that should be followed during the installation and maintenance of all Tripp Lite SmartOnline 3-Phase 20kVA and 30kVA UPS Systems.

UPS Location Warnings

- Install your UPS in a controlled environment.
- Install your UPS indoors, away from heat, direct sunlight, dust, and excess moisture or other conductive contaminants.
- Install your UPS in a structurally sound area that is level. Your UPS is extremely heavy; take care when moving and lifting the unit.
- Only operate your UPS at indoor temperatures between 32° F and 104° F (between 0° C and 40° C). For best results, keep indoor temperatures between 62° F and 84° F (between 17° C and 29° C).
- Leave adequate space around all sides of the UPS for proper ventilation.
- Do not install the UPS near magnetic storage media, as this may result in data corruption.
- The UPS System is designed to support a maximum load rating of one (1) power module and up to two (2) fully-loaded battery modules. Failure to observe this maximum load rating (by stacking more than one power module and/or more than two battery modules) will cause permanent damage to the UPS System and create a potential for serious personal injury.
- The UPS System's caster wheels are only designed for slight position adjustments within the final installation area; they are not designed for moving the UPS System over considerable distances. The wheels are not designed to provide long-term support for the UPS system after final installation. Mounting bracket installation is required. (See section 3, *Installation.*)

UPS Connection Warnings

- The power supply for this unit must be three phase rated in accordance with the equipment nameplate. It also must be suitably grounded according to all applicable local electrical wiring regulations.
- When installing the unit, verify that any maintenance bypass panel used is configured correctly before applying power to the unit.

Equipment Connection Warnings

- Use of this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly affect its safety or effectiveness is not recommended. Do not use this equipment in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
- The UPS system contains its own energy source (battery). The output terminals may be live even when the UPS is not connected to an AC supply.

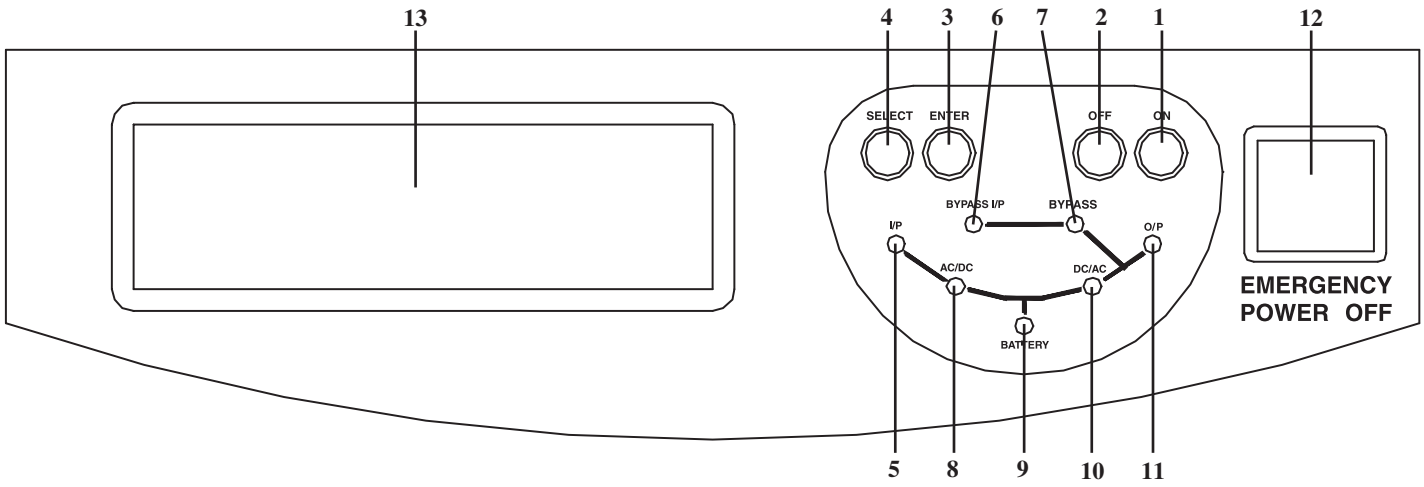
Battery Warnings

- Your UPS does not require routine maintenance. Do not open the UPS's power module for any reason; there are no user-serviceable parts inside. Because of the risk of electrical shock, only qualified electricians should open the battery module.
- Because the batteries present a risk of electrical shock and burn from high short-circuit current, batteries should be changed only by trained service personnel observing proper precautions. Remove watches, rings, and other metal objects. Use tools with insulated handles. Wear rubber gloves and boots. Do not lay tools or metal parts on top of the batteries. Do not short or bridge the battery terminals with any object.
- Do not dispose of the batteries in a fire. The UPS batteries are recyclable. Refer to local codes for disposal requirements, or in the USA only, refer to these sources for recycling information: 1-800-SAV-LEAD (1-800-728-5323), 1-800-8-BATTERY (1-800-8-228-8379), or www.rbrc.com.
- Internal batteries must be replaced by equivalent batteries available from Tripp Lite.
- Do not operate your UPS without batteries.
- Battery fuses should be replaced only by factory authorized personnel. Blown fuses should be replaced only with fuses of the same number and type.
- Potentially lethal voltages exist within this unit as long as the battery supply is connected. Service and repair should be done only by trained personnel. During any service work, the UPS should be turned off or put into manual bypass.
- Do not connect or disconnect the battery modules while the UPS is operating from the battery supply or when the unit is not in bypass mode.
- The UPS system ships with the internal batteries disconnected. Refer to section 7, *Adding or Replacing Internal Batteries*, for battery connection instructions.

2. Control Panels

2.1 Front Panel

Note: *Familiarize yourself with the location and function of the features on your UPS system before installing and operating it.*



1. **"ON" Button:** This button turns the UPS System's inverter ON.
2. **"OFF" Button:** This button turns the UPS System's inverter OFF.

   Note: *If the UPS System remains off for an extended period of time, it should be turned back on periodically to allow the internal batteries to recharge. The UPS System should be turned on and the internal batteries should be recharged at least one uninterrupted 24-hour period every 3 months. Failure to provide periodic recharge time may cause irreversible battery damage.*
3. **"ENTER" Button:** This button changes or selects the variables shown on the LCD Display. Simultaneously press the "ENTER" Button and the "SELECT" Button and hold for a ¼ second to mute audible alarm.
4. **"SELECT" Button:** This button allows you to browse through different power readings on the LCD Display by momentarily pressing the button. Simultaneously press the "ENTER" Button and the "SELECT" Button and hold for a ¼ second to mute audible alarm.
5. **"I/P" (Input) LED:** This green light will illuminate constantly to indicate an AC input supply is present.
6. **"BYPASS I/P" (Bypass Input) LED:** This green light will illuminate to indicate an AC input supply is present at bypass input.
7. **"BYPASS" LED:** This yellow light will flash when the UPS is providing filtered mains power without engaging its converter or inverter. Connected equipment will not receive battery power in the event of a blackout.
8. **"AC/DC" (Converter) LED:** This green light will illuminate constantly to indicate the UPS's AC/DC converter is activated.
9. **"BATTERY" LED:** This red light will flash when the UPS is discharging the battery to provide connected equipment with AC power. An alarm will sound which can be muted by simultaneously pressing and holding the "ENTER" and "SELECT" Buttons for a ¼ second. The alarm will be muted, but the LED will remain illuminated.
10. **"DC/AC" (Inverter) LED:** This green light will illuminate constantly to indicate the UPS's DC/AC inverter is activated.
11. **"O/P" (Output) LED:** This green light will illuminate constantly to indicate your UPS is supplying AC power to connected equipment.
12. **"EMERGENCY POWER OFF" Button:** This button turns the UPS output OFF and disables Bypass output. After pressing the button, it will remain down until reset. To reset the UPS System and restore output, press the "Emergency Power Off" Button once, and it will pop back up. If the Input Breakers are OFF, turn them ON. Press the "OFF" Button for 3 seconds (until a beep is heard); this will place the UPS System in "Bypass Mode." Then, press the "ON" Button for one second. The UPS will re-start if AC line power is present.
13. **LCD Display:** This backlit dot matrix display indicates a wide range of UPS operating conditions and diagnostic data. It will illuminate after you have properly completed installation and start-up and after the "ON" Button is depressed.

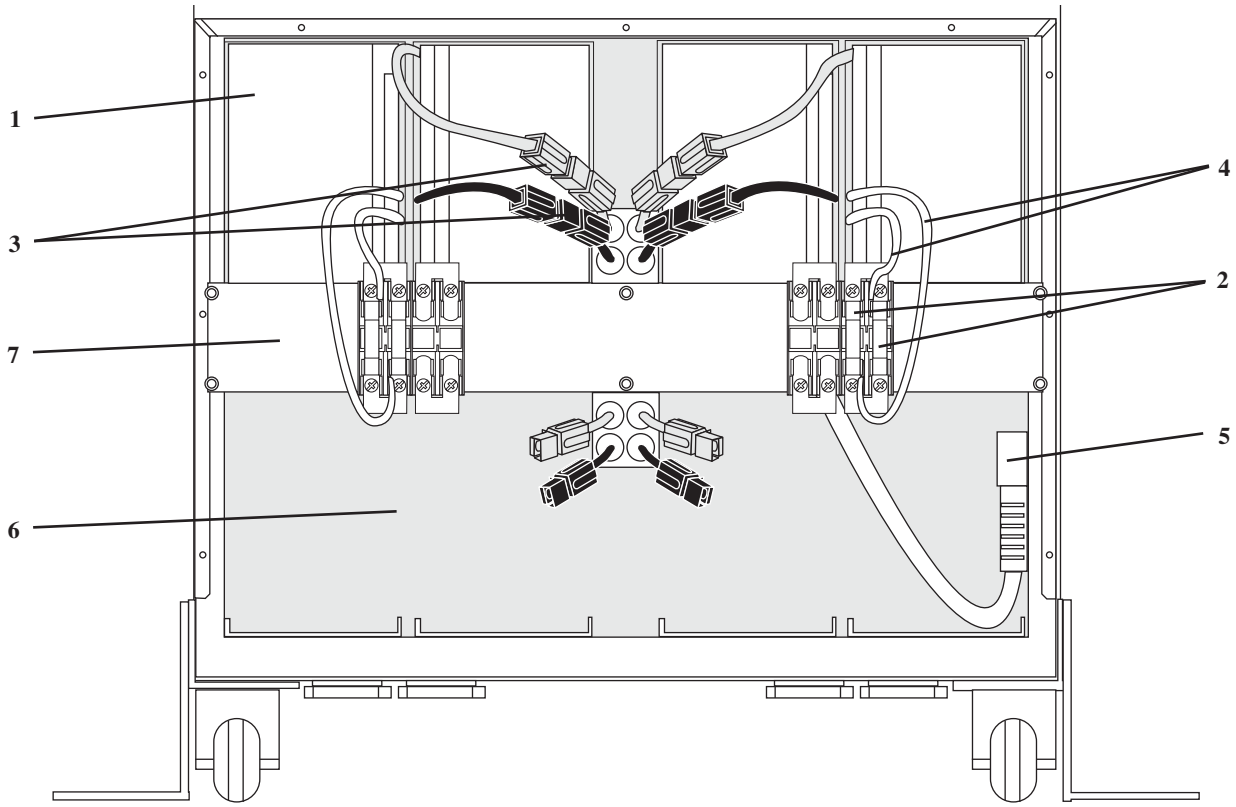
    Note: *The LCD Display's backlighting will turn off 10 minutes after any of the following front-panel buttons have been depressed: "SELECT," "ENTER" or "ON." To turn on the LCD Display's backlighting, momentarily depress any of the following front-panel buttons: "SELECT," "ENTER" or "ON."*

    Exhaust Fans (not shown): These cool and ventilate the inside of the UPS.

2. Control Panels *(continued)*

2.2 Battery Access Panel (Cover Removed)

Individual models may vary slightly from diagram.

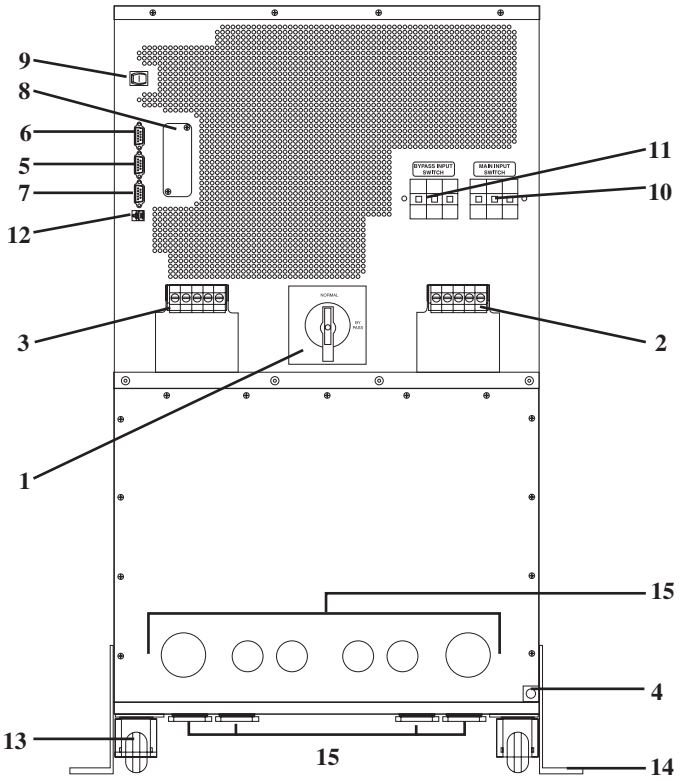


1. **Internal Battery Packs:** These supply backup runtime to connected equipment. Each pack consists of two strings (one positive and one negative). The number of included battery packs varies depending on UPS model number. Battery packs must replaced by a qualified electrician. ***Note:*** *The UPS system ships with the internal batteries disconnected. Refer to the* Adding or Replacing Internal Batteries *section for battery connection instructions.*
2. **Battery Cartridge Fuses:** Protect against short circuit damage. If a heavy overload or short circuit is encountered, a fuse will blow. A battery pack with a blown fuse will not deliver any output voltage to the UPS system. The fuses must be replaced by a qualified electrician. (See section 7, *Adding or Replacing Internal Batteries* for details.)
3. **Internal Battery Pack Connectors (Red & Black):** Connect the individual internal battery packs to the overall battery system.
4. **Internal Battery Pack Jumper Cables (White & Blue):** Connect the internal battery pack strings together through the fuse block.
5. **Battery System Connectors:** One connector (internal, not shown) connects the battery module to the power module. The other connector (shown) connects the battery module to an additional optional battery module (not shown, available separately from Tripp Lite). The battery system connectors are only utilized when adding an additional battery module. Use of these connectors is outlined in the owner's manual included with the additional battery module.
6. **Extended Runtime Capability:** Open slots accept additional internal battery packs (available separately from Tripp Lite) to extend runtime. The number of open slots varies depending on UPS model number. All models accept the connection of an additional battery module (available separately from Tripp Lite) to further extend runtime. Contact Tripp Lite for details.
7. **Fuse Block Bracket:** Accepts battery cartridge fuses.

2. Control Panels *(continued)*

2.3 Rear Panel

Individual models may vary slightly from diagram.



1. **Manual Bypass Switch:** This dial is used to put the UPS in "BYPASS" mode, which must be done before performing any maintenance on the UPS with the connected load supported. (See section 5, *Operation (Special Conditions)*, for step-by-step instructions for going into "BYPASS.") While this switch is on "BYPASS," connected equipment will receive filtered AC mains power, but will not receive battery power in the event of a blackout.
2. **Input Terminal Block (cover removed):** Use these terminals to connect your UPS to the AC main power input. Unscrew and remove terminal block plate for access.
3. **Output Terminal Block (cover removed):** Use these terminals to connect your UPS to equipment. Unscrew and remove terminal block plate for access.
4. **Grounding Lug:** Connects the UPS system to earth ground. (See section 3, *Installation*.)
5. **AS-400 Interface Port:** This female DB9 port connects your UPS to an IBM AS-400 computer interface via an AS-400 Cable. It uses AS-400 communications to report UPS status and power conditions. Using this port, an IBM AS-400 computer can automatically save open files and shut down its operating system during a blackout. (See section 6, *Communications*.)
6. **"Smart" RS-232 Interface Port:** This female DB9 port connects your UPS to a workstation or server. It uses RS-232 communications to report UPS and power conditions. It is used with Tripp Lite software and an RS-232 Cable to monitor and manage network power and to automatically save open files and shut down equipment during a blackout. (See section 6, *Communications*.)
7. **Dry Contact Interface Port:** This female DB9 port sends contact-closure signals to indicate line-fail and low-battery status. (See section 6, *Communications*.)
8. **Accessory Slot:** Remove the small cover panel and use optional accessories to remotely control and monitor your UPS. Contact Tripp Lite Customer Support for more information and a list of available SNMP, network management and connectivity products.
9. **"Battery Start" Switch:** This momentary rocker switch allows you to "cold-start" your UPS and use it as a stand-alone power source when utility-supplied AC power is not present. The switch enables the UPS's DC/AC Inverter. Before "cold-starting" your UPS, make sure it is properly installed. Press and hold the "Battery Start" Switch and then press the "ON" button to turn your UPS ON. To turn it OFF after "cold-start," press the "OFF" button.
10. **Main Input Switch:** Circuit breaker controls AC input power to the UPS during normal operation.
11. **Bypass Input Switch:** Circuit breaker controls AC input power to the UPS during "BYPASS" operation.
12. **Remote "Emergency Power OFF" (EPO) Connector:** This modular jack allows remote emergency shutdown. (See section 6, *Communications*.)
13. **Wheels:** The wheels are only designed for slight position adjustments within the final installation area; they are not designed for moving the UPS System over considerable distances. ***Note:*** *The wheels are not designed to provide long-term support for the UPS system after final installation. Mounting bracket installation is required. See* Installation *section.*
14. **Mounting Brackets:** Help support the UPS system. ***Note:*** *Mounting bracket installation is required. (See* Installation *section.)*
15. **Hardwire Access Points:** Allow either back panel or bottom panel access for electrical connection.

3. Installation

3.1 UPS Location

Move your UPS over short distances using its wheels. ***Note:*** *The wheels are not designed to provide long-term support for the UPS system after final installation. Mounting bracket installation is required.*

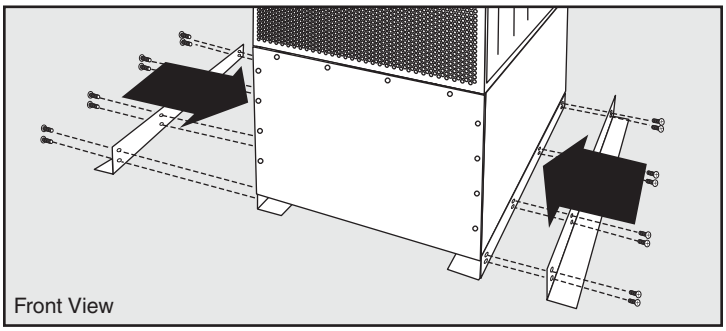
3.2 Mounting Bracket Installation

DANGER!

RISK OF PRODUCT DAMAGE AND SERIOUS PERSONAL INJURY

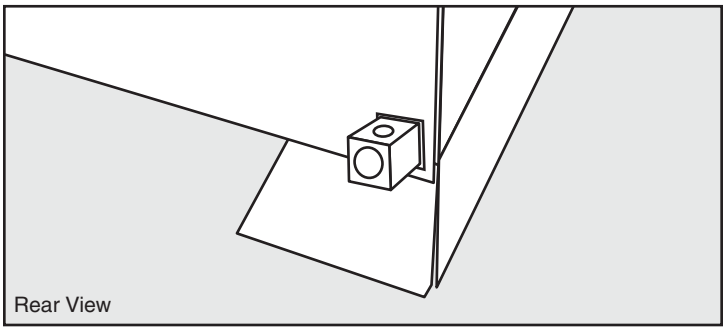
The UPS System's wheels are not designed to provide long-term support for the UPS system after final installation. *MOUNTING BRACKET INSTALLATION IS REQUIRED.* If the mounting brackets are not installed, the wheels may eventually fail and potentially damage the UPS System and cause serious personal injury.

Using the included bolts, install one mounting bracket on each side of the UPS System as shown. If desired, install the bracket to the floor surface with user-supplied hardware.



3.3 Grounding Connection

Using a user-supplied 4 AWG ground wire, connect the UPS System's ground lug to earth ground. Tighten connections with a torque of not less than 35 inch-lbs. (3.9 NM). Keep ground wire connected at all times after installation.



3.4 UPS Input And Output Hardwire Connection

Warning: When installing the unit, verify that any maintenance bypass panel used is configured correctly before applying power to the unit.

In addition to the instructions listed below, follow all warnings found in section 1, *Important Safety Warnings*, prior to connection.

- Install with flex cable of sufficient length to move UPS clear of surrounding equipment for servicing (sides and rear).
- Use ferrule caps to cover termination cables connected to UPS to avoid frayed ends from shorting on terminal block.
- Neutral conductor must be same size as current conductors.

WIRING SELECTION

Choose appropriate cabling (rated VW-1, FT-1 or better) to connect your UPS to an AC power supply and your equipment.

UPS System Model	Wiring Size
20kVA	6 AWG / 14 mm^2
30kVA	4 AWG / 22 mm^2

Maximum Cable Length: 10 m (32.8 ft)

3. Installation *(continued)*

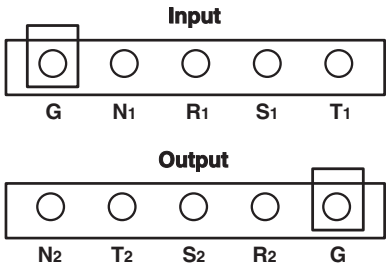
3.4 UPS Input And Output Hardwire Connection *(continued)*

WIRING CONNECTION

Connect your wiring to the input and output terminal blocks located on the rear panel of your UPS (see figure below).

CAUTION!
Qualified personnel should follow all procedures prescribed by N.E.C. and other local codes for hardwiring devices to a utility source.
Ensure that cables are fitted with cable sleeves and are secured by connector clamps. Tighten connections with a torque of not less than 35 inch-pounds. Observe the appropriate cable connection regulations [e.g. National Electrical Code (NEC) in the U.S.] at all times. Using cables of improper size may damage your equipment and cause fire hazards.

Note: *When shipped from the factory, bypass input and main input wires are connected.*



3.5 Initial Battery Charging

Although the internal batteries are charged prior to shipping, allow the internal batteries to charge uninterrupted for 24 hours after initial installation.

4. Operation (Normal Conditions)

4.1 Turning the UPS On

- Make sure the UPS is properly installed (see section 3, *Installation*) and the Manual Bypass Switch is set to NORMAL.
- Turn the AC Main Input Switch and Bypass Input Switch Circuit Breakers ON.
- If your AC input is providing power normally within your selected range, your connected load will energize in Bypass. However, the UPS's inverter is not yet on. Press the front “ON” button to begin inverter operation.
- If your AC input is not providing power normally, you have the option of starting from battery. (Your battery must be at least partially charged for this operation to succeed.) Press and hold both the "Battery Start" switch and the “ON” button for three seconds to start your UPS in “ON BATTERY” mode. Note that some electronic equipment may draw more amps during startup; when starting from battery, consider reducing the initial load on the UPS.
- The UPS will perform a brief self-test and show the results on the LCD Display. (See section 4.3, *Self-Testing* for display sequence.) After a successful self-test, the UPS will provide AC power from the inverter to your load.

4.2 Turning the UPS Off

- Press the front “OFF” button. Your load will still be energized. The inverter is now off, but your UPS is not fully deactivated. The LCD Display will show “ON BYPASS.”
- Turn the Main Input Switch and Bypass Input Switch Circuit Breakers OFF. Your load will no longer be energized, and the LCD display will be dark.

  NOTE: If the UPS System remains off for an extended period of time, it should be turned back on periodically to allow the internal batteries to recharge. The UPS System should be turned on and the internal batteries should be recharged at least one uninterrupted 24-hour period every 3 months. Failure to provide periodic recharge time may cause irreversible battery damage.

4.3 Self-Testing

When you turn the UPS ON, it will perform a brief self-test. See charts below for display sequences.

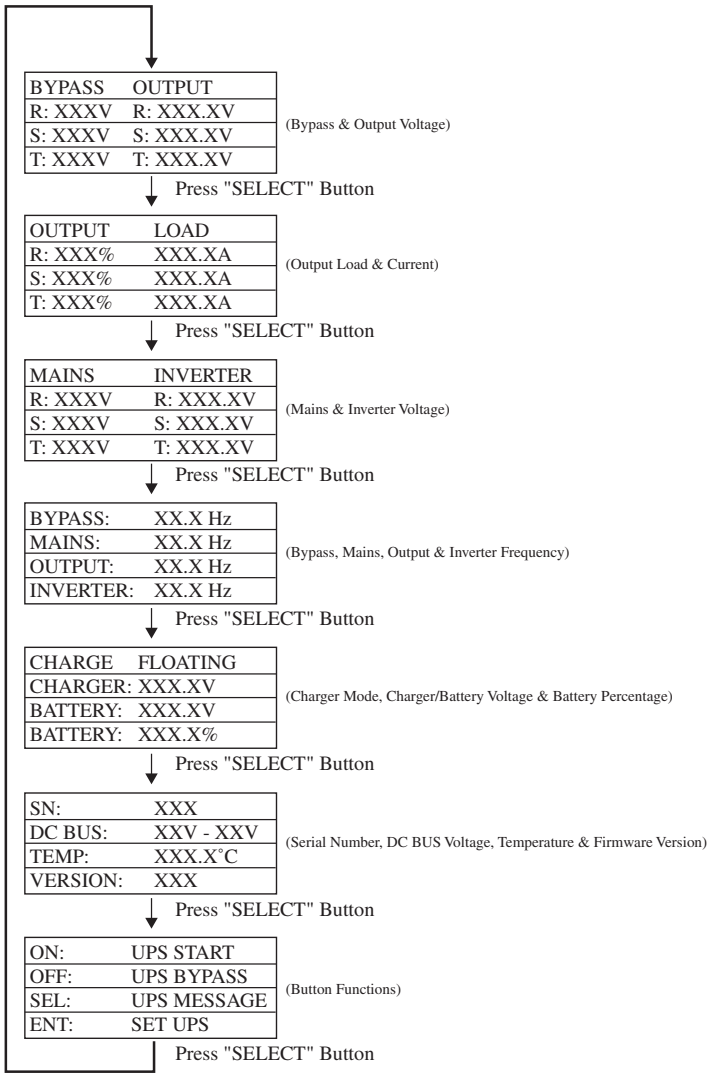
Display sequence when AC input power is present:
SELF TESTING...
RECTIFIER OK
CHARGER OK
BATTERY OK
DC TO DC OK
INVERTER TEST

Display sequence when AC input power is absent: (possible only with the "Battery Start" Switch)
SELF TESTING...
BATTERY OK
DC TO DC OK
INVERTER TEST

4. Operation (Normal Conditions) *(continued)*

4.4 LCD Display Select Button

Momentarily press the "SELECT" button on the front panel to browse through different power readings on the LCD Display.



5. Operation (Special Conditions)

5.1 Operation On Bypass—Voltage Out Of Range

While in Bypass Mode, the UPS monitors the input voltage, which on Bypass equals the output voltage. If the output voltage passes out of an acceptable range (between 15% higher and 20% lower than nominal), the UPS displays the condition on its LCD and stops supplying output power to its load. If power levels return to an acceptable level, the UPS resumes supplying power to the load, and its LCD reports that output voltage was too high or too low at one time, but has returned to nominal.

Bypass Voltage Condition	LCD Display Message
>15% Higher than Nominal	BYPASS HI NO O/P
>20% Lower than Nominal	BYPASS LO NO O/P
Was Too High, Now Nominal	BYPASS WAS HI
Was Too Low, Now Nominal	BYPASS WAS LO

5. Operation (Special Conditions) *(continued)*

5.2 Inverter On Warnings

When the inverter is ON, the LCD Display may show any one of the following warnings:

Condition	LCD Display Message
UPS Output Overload	OVERLOAD 110%
UPS Charger Failure	CHARGER FAILURE
Abnormal Input Frequency	FREQUENCY ERROR
Abnormal Input Phase	PHASE ABNORMAL!
Battery is Depleting*	ON BATTERY
Battery Charge is Nearly Depleted*	BATTERY LOW.

* During a prolonged blackout, users should save files and shut down connected equipment. The "BATTERY LOW" message indicates the UPS's batteries are nearly out of power and UPS shutdown is imminent

5.3 Operation Under Shutdown

Your UPS will shut down and the LCD will display a message if it detects one of the following conditions. ***Note:*** *For all conditions, the "Input," "Output" and "Bypass" LEDs will be illuminated.*

Condition	LCD Display Message
Overload Shutdown	ON BYPASS
	OVERLOAD 150%
	SHUTDOWN...
	VERSION: XXXXXXX
UPS Output Short Circuit	ON BYPASS
	SHORT CIRCUIT!
	SHUTDOWN...
	VERSION: XXXXXXX
Overtemperature	ON BYPASS
	HIGH TEMP!
	SHUTDOWN...
	VERSION: XXXXXXX
DC BUS Overvoltage	ON BYPASS
	DC BUS O.V.P.!
	SHUTDOWN...
	VERSION: XXXXXXX
DC BUS Failure	ON BYPASS
	DC BUS FAIL!
	SHUTDOWN...
	VERSION: XXXXXXX

Condition	LCD Display Message
R/S/T Inverter Output Failure	ON BYPASS
	R OUTPUT FAIL!
	SHUTDOWN...
	VERSION: XXXXXXX
Low Battery	BYPS OFF NO O/P
	LOW BATTERY!
	SHUTDOWN...
	VERSION: XXXXXXX
Remote Shutdown	BYPS OFF NO O/P
	REMOTE SHUTDOWN
	SHUTDOWN...
	VERSION: XXXXXXX
Emergency Stop	BYPS OFF NO O/P
	EMERGENCY STOP!
	SHUTDOWN...
	VERSION: XXXXXXX

5.4 Operation Of Manual Bypass Switch

Warning: Failure to follow this procedure could damage the unit and void its warranty.

Warning: When installing the unit, verify that any maintenance bypass panel used is configured correctly before applying power to the unit.

Turn this switch to "BYPASS" before performing any maintenance on the UPS with the connected load supported. Connected equipment will receive filtered AC mains power, but will not receive battery power in the event of a blackout.

SWITCHING UPS TO "BYPASS" MODE

- Press the "OFF" button.
- Turn the "Manual Bypass" Switch clockwise from NORMAL to BYPASS.
- Turn the Main Input Switch Circuit Breaker OFF.

SWITCHING UPS TO "NORMAL" MODE

- Turn the Main Input Switch Circuit Breaker ON.
- Turn the "Manual Bypass" Switch counterclockwise from BYPASS back to NORMAL.
- Press the "ON" button.

6. Communications

6.1 RS-232 Interface

This female DB9 port connects your UPS via an RS-232 cable to a workstation or server equipped with Tripp Lite software. The port uses RS-232 communications to report UPS status and power conditions. Using this port, Tripp Lite software can monitor and manage network power and automatically save open files and shut down equipment during a blackout. Contact Tripp Lite Customer Support at (773) 869-1234 for information on available SNMP, network management and connectivity software and products.

RS-232 signals and operations include: load level, battery status, battery level, operation mode, AC input voltage, AC output voltage, AC input frequency, temperature inside unit, set shut-down delay time, enable/disable alarm and remote shutdown.

Hardware:

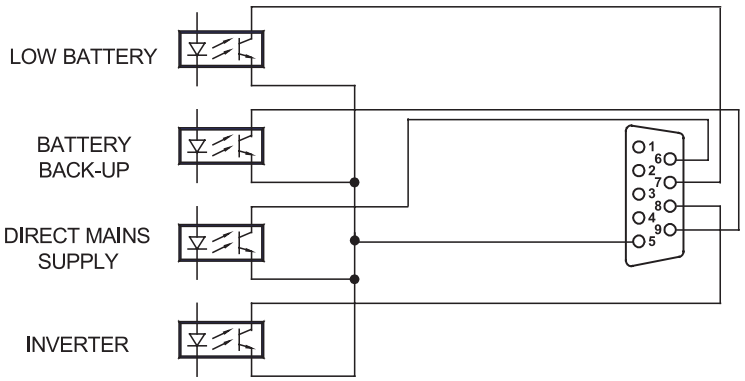
Baud Rate: 2400 BPS
Data Length: 8 bits
Stop Bit: 1 bit
Parity: NONE

Pin assignment:

Pin 2: TXD (Transmit Data)
Pin 3: RXD (Receive Data)
Pin 5: GND (Signal Ground)

6.2 AS-400 Interface

This female DB9 port connects your UPS to an IBM AS-400 computer via an AS-400 cable. The port uses AS-400 communications to report UPS status. It can be used to allow an AS-400 to automatically save open files and shut down its operating system during a blackout. AS-400 protocol includes: operation on inverter, operation on AC power supply, operation on battery and low battery alarm.



Pin assignment:

Pin 5: Common
Pin 6: Operation on AC power supply
Pin 7: Low battery alarm
Pin 8: Operation on inverter
Pin 9: Operation on battery

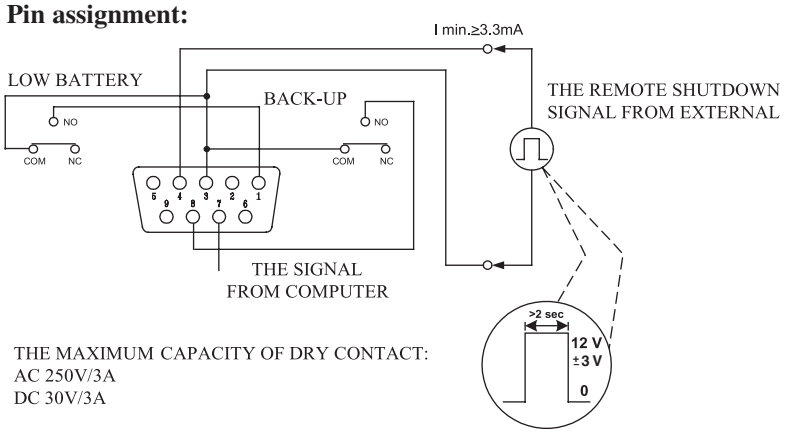
AS-400 INTERFACE TABLE				
	Pin 6,5	Pin 7,5	Pin 8,5	Pin 9,5
Battery	OFF	*	ON	ON
Low Battery	OFF	ON	ON	ON
Direct Mains Supply	ON	OFF	OFF	OFF
Inverter	OFF	*	ON	*

* Inactive: may be in either state.

6.3 Dry Contact Interface

This female DB9 contact-closure port allows your UPS to send contact-closure signals to indicate that it is on battery back-up mode and if its batteries are running low. The port can also receive a remote shutdown signal.

Pin assignment:



THE MAXIMUM CAPACITY OF DRY CONTACT:
AC 250V/3A
DC 30V/3A

DRY CONTACT INTERFACE TABLE		
UPS Operating Mode	Pin 8,3	Pin 1,3
Normal	OPEN	OPEN
Back Up	CLOSE	*
Low Battery	CLOSE	CLOSE

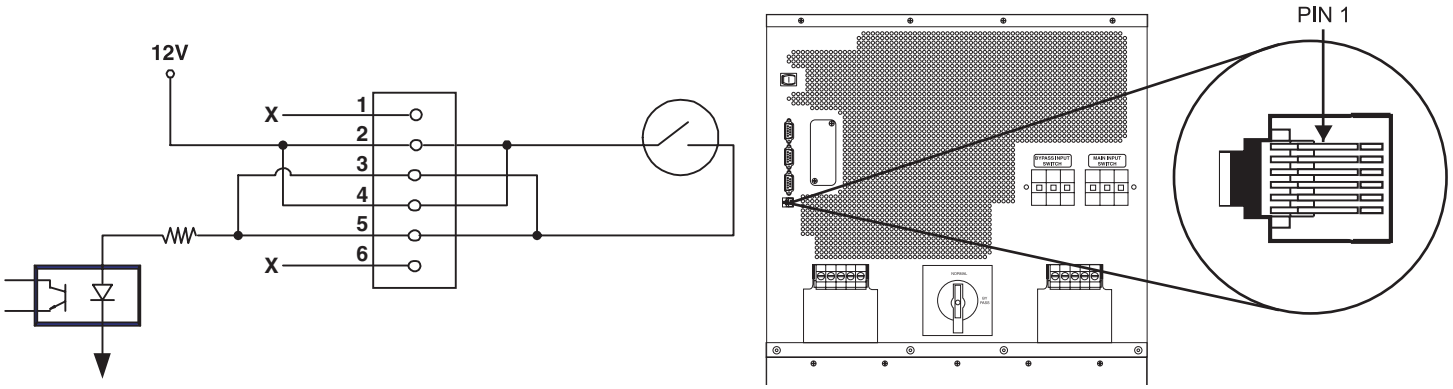
* Inactive: may be in either state.

6. Communications *(continued)*

6.4 Remote Emergency Power Off (EPO)

This optional feature is only for those applications which require connection to a facility's Emergency Power Off (EPO) circuit. When the UPS System is connected to this circuit, it enables emergency shutdown of the output. Using a user-supplied cable, connect the UPS System's EPO port to a user-supplied remote switch. The EPO port is not a phone line surge suppressor; do not connect a phone line to this port. The pin assignments for the EPO port are shown in the following diagram. Note: if there is a short between pins 2 and 3, 2 and 5, 4 and 5, or 3 and 4, the UPS system will power off. To reset from a Remote Emergency Power Off Shutdown, make sure there is AC line input power present, the Input Breakers are ON, and the shutdown-signal has been removed from the EPO circuit. Press the front panel "OFF" Button for 2 to 3 seconds (until a beep is heard); this will place the UPS System in "Bypass Mode." Then, press the "ON" Button for one second. The UPS will re-start if AC line power is present.

Pin assignment:



7. Adding or Replacing Internal Batteries

DANGER!

POTENTIALLY LETHAL HIGH VOLTAGE! FOR QUALIFIED ELECTRICIANS ONLY!

Follow all safety precautions in the Safety section before adding or replacing internal batteries.

DANGER!

DO NOT REMOVE BATTERY SLEEVE!

Do not remove the plastic sleeve covering the battery strings. The sleeve is designed to prevent accidental contact with the terminals on the individual batteries. Contact with the terminals will create a potential for serious injury or death from lethal high voltage. Do not allow tools or other metal objects to come in contact with the terminals.

CAUTION!

BATTERY PACKS ARE HEAVY!

Use assistants as needed.

WARNING!

CHECK BATTERY PACK VOLTAGE BEFORE COMPLETING INSTALLATION

Do not install battery packs with DC voltages outside the acceptable range. (They may compromise battery backup capabilities).

NOTE!

Each battery pack consists of two strings of batteries: one string with a BLACK cable and one string with a RED cable.

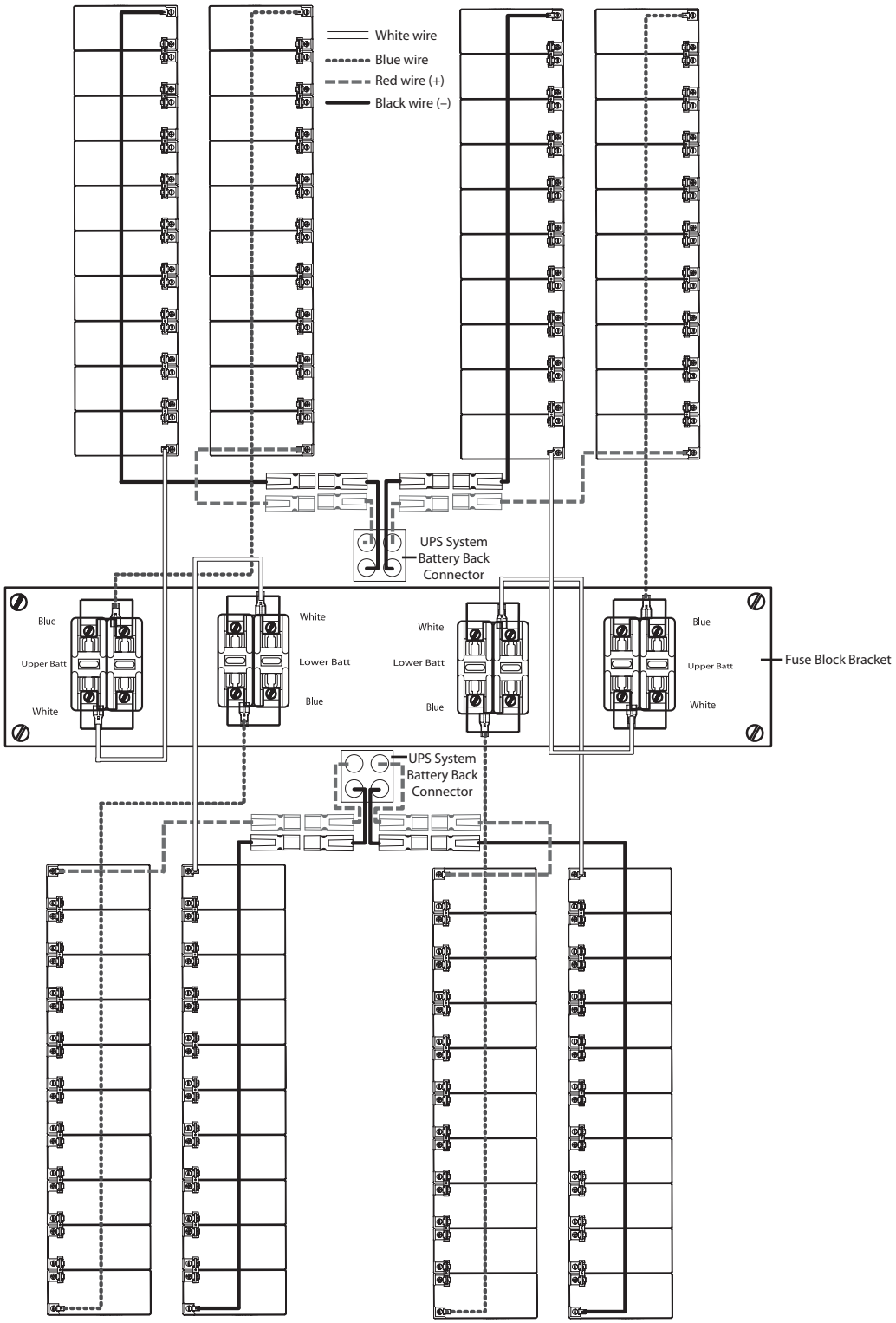
The batteries are designed for hot-swap replacement, which allows connected equipment to continually receive AC mains power (but not battery backup support in the event of a blackout) during the battery installation procedure. (See section 5.4, *Operation of Manual Bypass Switch*.) Although the batteries can be hot-swapped, qualified service personnel may want to completely turn the UPS off during battery installation. (See section 4.2, *Turning the UPS Off*.)

Internal battery packs must be replaced by equivalent batteries available from Tripp Lite. Adding battery packs will increase recharge time. Individual models may vary slightly from diagrams.

7. Adding or Replacing Internal Batteries *(continued)*

7.1 Internal Battery Pack Wiring Diagram

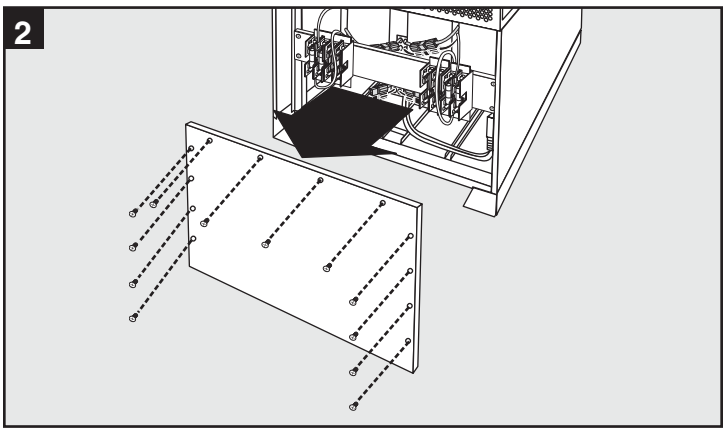
Qualified service personnel should familiarize themselves with the battery pack wiring diagram prior to adding or replacing batteries. The battery module can accept up to four battery packs (each pack consisting of two strings). The diagram shows all four battery packs connected for illustrative purposes only. The actual number of batteries shipped with the UPS System varies depending on model number.



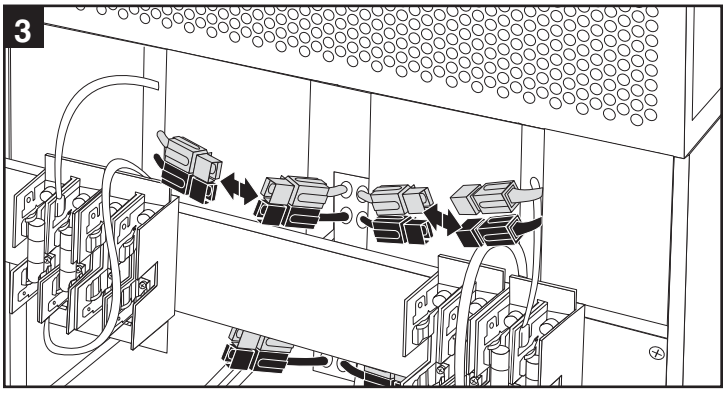
7. Adding or Replacing Internal Batteries *(continued)*

1 Place the UPS System in Bypass Mode or completely turn it off, depending on preference. (See section 5.4, *Operation of Manual Bypass Switch*, or 4.2, *Turning the UPS Off*.)

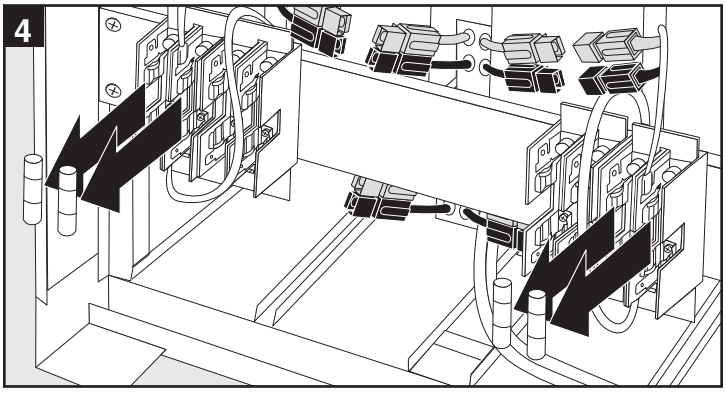
2 Remove battery access panel, located on the FRONT of the UPS system.



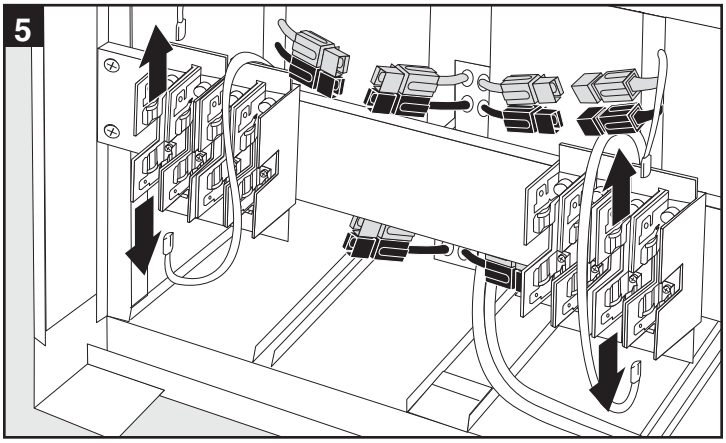
3 Disconnect the **RED** and **BLACK** cables attached to each internal battery pack.



4 Remove the battery cartridge fuses from each fuse block. Save the fuses.



5 Disconnect the **BLUE** and **WHITE** jumper cables attached to each fuse block.

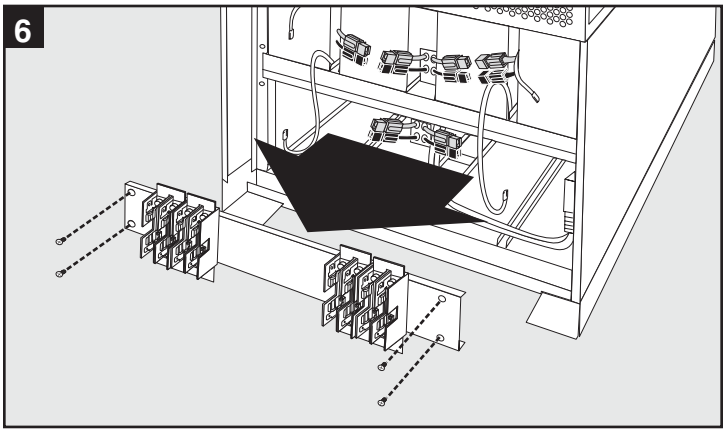


CAUTION!

When disconnecting the jumper cables, pull them straight away from the fuse block with even force. Do not wiggle them side-to-side, as this may damage the connector.

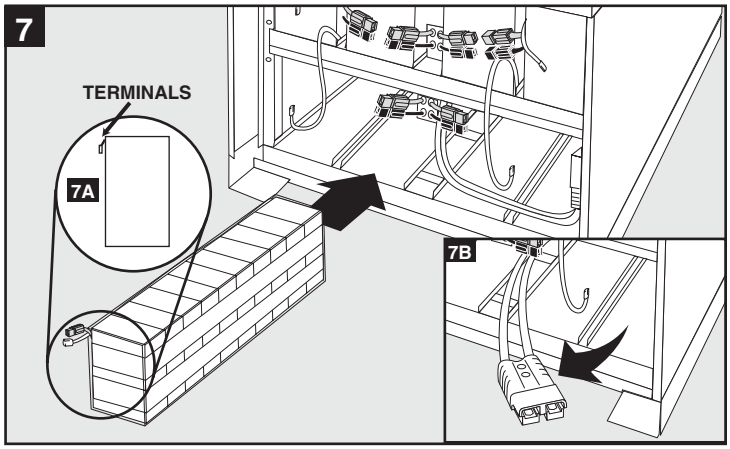
7. Adding or Replacing Internal Batteries *(continued)*

6 Remove the fuse block bracket.

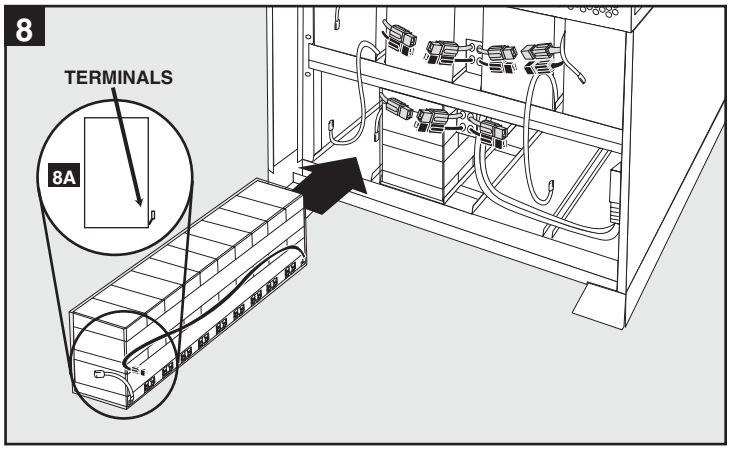


7 Slide the battery string with the **RED** cable into an empty slot within the battery compartment as shown. Make sure that the string is oriented as shown in the diagram **7A**.

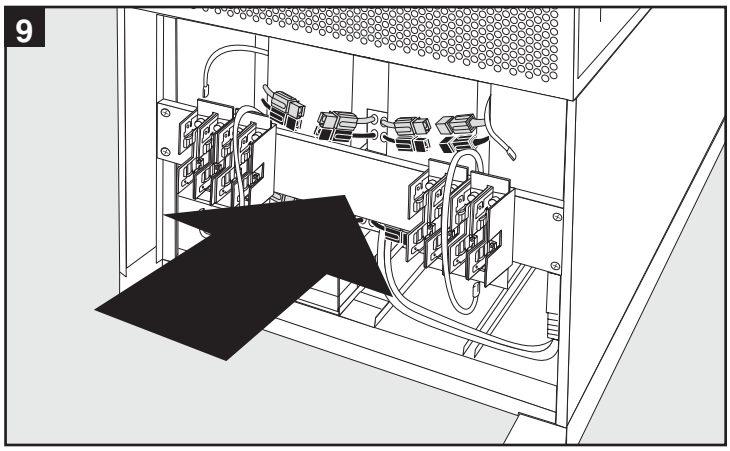
Note: *If the auxiliary battery connector is in the way, remove its mounting screw and position the cable to allow adequate room to add the battery strings* **7B**.



8 Slide the battery string with the **BLACK** cable next to it (on the left) in the empty slot as shown. Make sure that the string is oriented as shown in the diagram **8A**.

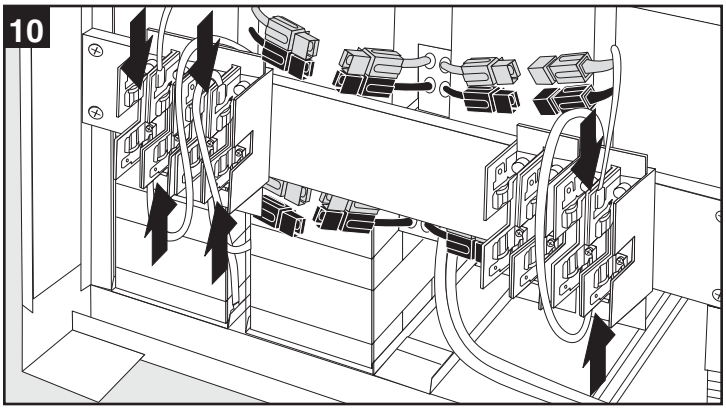


9 Replace the fuse block bracket. Make sure printing on bracket is oriented so it is readable.

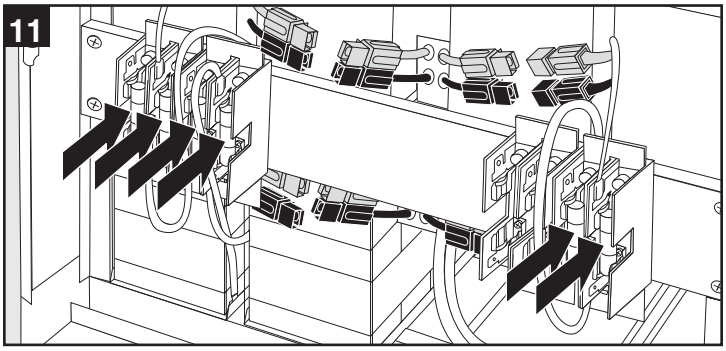


7. Adding or Replacing Internal Batteries *(continued)*

10 Connect the **BLUE** and **WHITE** jumper cables on each internal battery pack to its corresponding fuse block. See printing next to fuse block to locate the correct fuse block for each cable.



11 Insert the battery cartridge fuses into each fuse block. The fuses are identical, and can be inserted into any of the blocks. Make sure that the fuses are firmly snapped into place.



DANGER!

BATTERY CARTRIDGE FUSES MUST BE INSERTED LAST DUE TO THE DANGER OF POTENTIAL ARCING OF CONNECTORS.

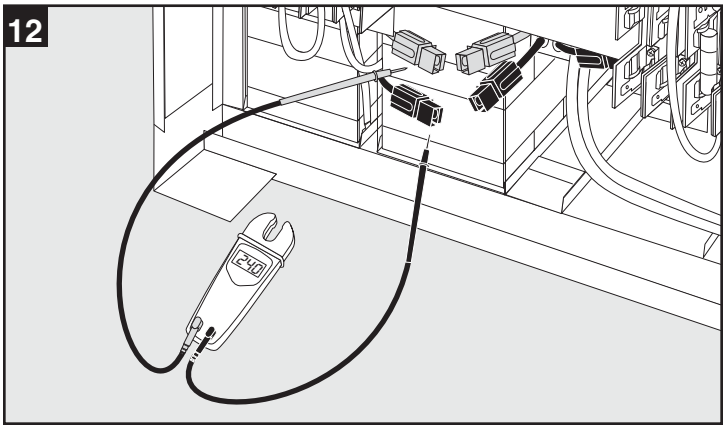
FUSE REPLACEMENT

The fuses protect against short circuit damage. If a heavy overload or short circuit is encountered, a fuse will blow. A battery pack with a blown fuse will not deliver any output voltage to the UPS system.

DANGER!

The fuses must be replaced by a qualified electrician. To reduce the risk of fire, replace only with fuses of the same type or rating (UL-recognized 30A 600VDC rated cartridge fuses).

12 Use a voltmeter (user-supplied) to test the voltage of the battery pack. Observe proper polarity: connect the voltmeter's **BLACK** probe to the battery pack's **BLACK** connector; connect the voltmeter's **RED** probe to the battery pack's **RED** connector. To get a proper reading, make sure the voltmeter's probes touch the metal contacts inside the battery pack's connectors. **The battery pack's Acceptable DC Voltage Range is between 220 and 280V DC.** If several attempts at voltmeter tests yield results outside this range, contact Tripp Lite for assistance in determining the possible causes of the incorrect voltage reading.



7. Adding or Replacing Internal Batteries *(continued)*

WARNING!

OBSERVE PROPER POLARITY!

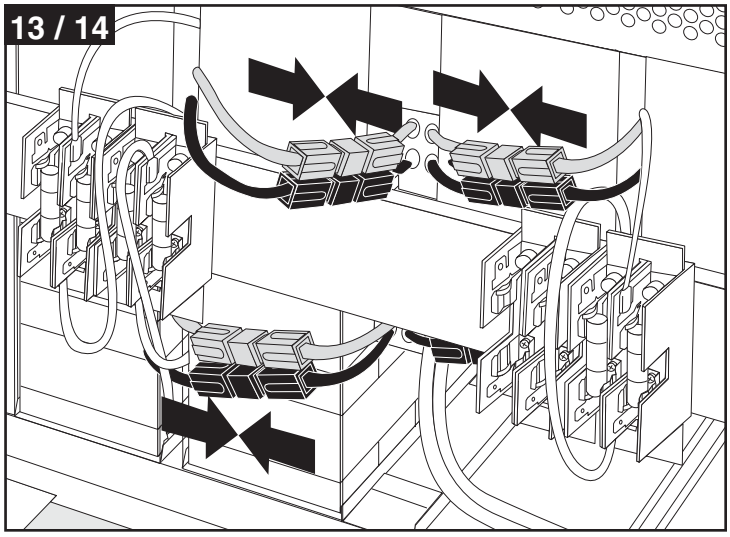
Connect BLACK-to-BLACK and RED-to-RED. Failure to observe proper polarity will cause permanent damage to the UPS System and create a potential for serious personal injury.

13 Connect the **BLACK** cable for each internal battery pack to the nearest **BLACK** connector located inside the UPS system's battery module.

14 Connect the **RED** cable for each internal battery pack to the nearest **RED** connector located inside the UPS system's battery module.

15 Replace the battery access panel.

16 Return the UPS System to Normal Mode or completely turn it on, depending on the procedure you followed in step 1. (See section 5.4, *Operation of Manual Bypass Switch*, or 4.1, *Turning the UPS On*.)



8. Warranty & Warranty Registration

Your SmartOnline 3-Phase UPS System is covered by the limited warranty described below. Extended warranty (2-, 3- and 4-year) and start-up service programs are available. For more information, call Tripp Lite Customer Service at (773) 869-1234.

3-Phase UPS System Limited Warranty

Seller warrants this product, if used in accordance with all applicable instructions as verified by Tripp Lite's "Start-up" service, to be free from original defects in material and workmanship for a period of one year (inside USA and Canada) from the date of purchase. If the product should prove defective in material or workmanship within that period, Seller will repair or replace the defective parts without charge for labor or parts. If the product was not started-up by authorized Tripp Lite service, replacement parts will be provided but labor charges will apply based on published Tripp Lite Time and Material Rates. Tripp Lite will assign to you any warranties provided by the manufacturers of components of the Tripp Lite product. Tripp Lite makes no representations as to the extent of these warranties and assumes no responsibility for warranties of these components. Service under this Warranty can only be obtained by contacting: Tripp Lite Customer Service; 1111 W. 35th Street; Chicago IL 60609; (773) 869-1234.

THIS WARRANTY DOES NOT APPLY TO NORMAL WEAR OR TO DAMAGE RESULTING FROM ACCIDENT, IMPROPER INSTALLATION, MISUSE, ABUSE OR NEGLECT. SELLER MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY EXPRESSLY SET FORTH HEREIN. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ALL IMPLIED WARRANTIES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY OR FITNESS, ARE LIMITED IN DURATION TO THE WARRANTY PERIOD SET FORTH ABOVE; AND THIS WARRANTY EXPRESSLY EXCLUDES ALL INCIDENTAL AND CONSEQUENTIAL DAMAGES. (Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may have other rights which vary from jurisdiction to jurisdiction).

WARRANTY REGISTRATION

Visit www.tripplite.com/warranty today to register the warranty for your new Tripp Lite product. You'll be automatically entered into a drawing for a chance to win a FREE Tripp Lite product!*

* No purchase necessary. Void where prohibited. Some restrictions apply. See website for details.

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your Tripp Lite product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to the series number. The series number should not be confused with the marking name or model number of the product.

FCC Specifications for Models with FCC Approval:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. The user must use shielded cables and connectors with this product. Any changes or modifications to this product not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

9. Specifications

Model: SU20K3/3	
Input	
Input Voltage	120/208V AC, 3ø, 4 Wire (plus ground), wye
Input Frequency	60 Hz ± 3 Hz
Voltage Correction Range	88-144/166-250V AC
Input Current (Per Phase, On-Line)	60A
Inrush Current	<300A
Power Factor (Full Load)	>0.95
Efficiency (Full Load/On-Line)	>89%
Circuit Breaker	100A (3p)
Input Bypass Circuit Breaker	100A (3p)
Output	
VA	20000
Watts (Power Factor: 0.8)	16000
Waveform (On-Line)	Sinewave
Waveform (On-Battery)	Sinewave
Output Voltage (RMS)	120/208V AC, 3ø, 4 Wire (plus ground), wye
Output Frequency	60 Hz (± 0.1 Hz on battery)
Voltage Regulation	±2%
Max. Harmonic Distortion (Non-Linear Full Load)	<5%
Overload Capabilities	≦102% (continuous), 102%~125% (1 min.), 125%~150% (30 sec.), ≧150% (2 sec.)
Short Circuit Capability	≧167A
Crest Factor	3:1
Battery	
Battery Type	Sealed, Lead Acid, 240V DC, 9AH
Battery Pack Quantity	Two Packs (20 12V DC Batteries per pack)
Protection	Four UL-recognized 30A 600VDC rated cartridge fuses (two per battery pack) and fuse block (1 per battery pack)
Typical Backup Time (Half Load)	17 min. +
Typical Backup Time (Full Load)	5 min. +
Operation	
On-Line Transfer Time (Line to Battery, Battery to Line)	0 ms
Audible Noise (Full Load @ 1 meter)	<65 dBA
Indicators	
Includes an LCD Display and LEDs (AC Line In, Bypass Line In, AC to DC, DC to AC, AC Output, Battery Back-Up, Bypass).	
Communications	
Includes an RS-232 DB9 female connector, an AS-400 DB9 female connector, a dry contact DB9 female connector and an accessory slot.	
Connections	
Input Terminal Block	100A
Output Terminal Block	100A
Physical Specifications	
Unit Dimensions (H x W x D)	35.3 x 19.3 x 36 in.
Unit Weight	520 lb.
Shipping Dimensions (HxWxD)	43 x 28 x 44.5 in.
Shipping Weight	609 lb.

Model: SU20K3/3XR5	
Input	
Input Voltage	120/208V AC, 3ø, 4 Wire (plus ground), wye
Input Frequency	60 Hz ± 3 Hz
Voltage Correction Range	88-144/166-250V AC
Input Current (Per Phase, On-Line)	60A
Inrush Current	<300A
Power Factor (Full Load)	>0.95
Efficiency (Full Load/On-Line)	>89%
Circuit Breaker	100A (3p)
Input Bypass Circuit Breaker	100A (3p)
Output	
VA	20000
Watts (Power Factor: 0.8)	16000
Waveform (On-Line)	Sinewave
Waveform (On-Battery)	Sinewave
Output Voltage (RMS)	120/208V AC, 3ø, 4 Wire (plus ground), wye
Output Frequency	60 Hz (± 0.1 Hz on battery)
Voltage Regulation	±2%
Max. Harmonic Distortion (Non-Linear Full Load)	<5%
Overload Capabilities	≦102% (continuous), 102%~125% (1 min.), 125%~150% (30 sec.), ≧150% (2 sec.)
Short Circuit Capability	≧167A
Crest Factor	3:1
Battery	
Battery Type	Sealed, Lead Acid, 240V DC, 9AH
Battery Pack Quantity	Five Packs (20 12V DC Batteries per pack)
Protection	Ten UL-recognized 30A 600VDC rated cartridge fuses (two per battery pack) and fuse block (1 per battery pack)
Typical Backup Time (Half Load)	42 min. +
Typical Backup Time (Full Load)	17 min. +
Operation	
On-Line Transfer Time (Line to Battery, Battery to Line)	0 ms
Audible Noise (Full Load @ 1 meter)	<65 dBA
Indicators	
Includes an LCD Display and LEDs (AC Line In, Bypass Line In, AC to DC, DC to AC, AC Output, Battery Back-Up, Bypass).	
Communications	
Includes an RS-232 DB9 female connector, an AS-400 DB9 female connector, a dry contact DB9 female connector and an accessory slot.	
Connections	
Input Terminal Block	100A
Output Terminal Block	100A
Physical Specifications	
Unit Dimensions (H x W x D)	48.5 x 19.3 x 36 in.
Unit Weight	935 lb.
Shipping Dimensions (HxWxD)	61.5 x 31 x 44.5
Shipping Weight	1152 lb.

+ Backup times are expandable with additional Battery Packs, sold separately. The policy of Tripp Lite is one of continuous improvement. Specifications are subject to change without notice.

9. Specifications *(continued)*

Model: SU30K3/3	
Input	
Input Voltage	120/208V AC, 3ø, 4 Wire (plus ground), wye
Input Frequency	60 Hz ± 3 Hz
Voltage Correction Range	88-144/166-250V AC
Input Current (Per Phase, On-Line)	90A
Inrush Current	<300A
Power Factor (Full Load)	>0.95
Efficiency (Full Load/On-Line)	>89%
Circuit Breaker	100A (3p)
Input Bypass Circuit Breaker	100A (3p)
Output	
VA	30000
Watts (Power Factor: 0.8)	24000
Waveform (On-Line)	Sinewave
Waveform (On-Battery)	Sinewave
Output Voltage (RMS)	120/208V AC, 3ø, 4 Wire (plus ground), wye
Output Frequency	60 Hz (± 0.1 Hz on battery)
Voltage Regulation	±2%
Max. Harmonic Distortion (Non-Linear Full Load)	<5%
Overload Capabilities	≦102% (continuous), 102%~125% (1 min.), 125%~150% (30 sec.), ≧150% (2 sec.)
Short Circuit Capability	≧250A
Crest Factor	3:1
Battery	
Battery Type	Sealed, Lead Acid, 240V DC, 9AH
Battery Pack Quantity	Three Packs (20 12V DC Batteries per pack)
Protection	Six UL-recognized 30A 600VDC rated cartridge fuses (two per battery pack) and fuse block (1 per battery pack)
Typical Backup Time (Half Load)	13 min. +
Typical Backup Time (Full Load)	5 min. +
Operation	
On-Line Transfer Time (Line to Battery, Battery to Line)	0 ms
Audible Noise (Full Load @ 1 meter)	<65 dBA
Indicators	
Includes an LCD Display and LEDs (AC Line In, Bypass Line In, AC to DC, DC to AC, AC Output, Battery Back-Up, Bypass).	
Communications	
Includes an RS-232 DB9 female connector, an AS-400 DB9 female connector, a dry contact DB9 female connector and an accessory slot.	
Connections	
Input Terminal Block	100A
Output Terminal Block	100A
Physical Specifications	
Unit Dimensions (H x W x D)	35.3 x 19.3 x 36 in.
Unit Weight	662 lb.
Shipping Dimensions (HxWxD)	43 x 28 x 44.5 in.
Shipping Weight	750 lb.

Model: SU30K3/3XR5	
Input	
Input Voltage	120/208V AC, 3ø, 4 Wire (plus ground), wye
Input Frequency	60 Hz ± 3 Hz
Voltage Correction Range	88-144/166-250V AC
Input Current (Per Phase, On-Line)	90A
Inrush Current	<300A
Power Factor (Full Load)	>0.95
Efficiency (Full Load/On-Line)	>89%
Circuit Breaker	100A (3p)
Input Bypass Circuit Breaker	100A (3p)
Output	
VA	30000
Watts (Power Factor: 0.8)	24000
Waveform (On-Line)	Sinewave
Waveform (On-Battery)	Sinewave
Output Voltage (RMS)	120/208V AC, 3ø, 4 Wire (plus ground), wye
Output Frequency	60 Hz (± 0.1 Hz on battery)
Voltage Regulation	±2%
Max. Harmonic Distortion (Non-Linear Full Load)	<5%
Overload Capabilities	≦102% (continuous), 102%~125% (1 min.), 125%~150% (30 sec.), ≧150% (2 sec.)
Short Circuit Capability	≧250A
Crest Factor	3:1
Battery	
Battery Type	Sealed, Lead Acid, 240V DC, 9AH
Battery Pack Quantity	Five Packs (20 12V DC Batteries per pack)
Protection	Ten UL-recognized 30A 600VDC rated cartridge fuses (two per battery pack) and fuse block (1 per battery pack)
Typical Backup Time (Half Load)	25 min. +
Typical Backup Time (Full Load)	11 min. +
Operation	
On-Line Transfer Time (Line to Battery, Battery to Line)	0 ms
Audible Noise (Full Load @ 1 meter)	<65 dBA
Indicators	
Includes an LCD Display and LEDs (AC Line In, Bypass Line In, AC to DC, DC to AC, AC Output, Battery Back-Up, Bypass).	
Communications	
Includes an RS-232 DB9 female connector, an AS-400 DB9 female connector, a dry contact DB9 female connector and an accessory slot.	
Connections	
Input Terminal Block	100A
Output Terminal Block	100A
Physical Specifications	
Unit Dimensions (H x W x D)	48.5 x 19.3 x 36 in.
Unit Weight	935 lb.
Shipping Dimensions (HxWxD)	61.5 x 31 x 44.5
Shipping Weight	1152 lb.

+ Backup times are expandable with additional Battery Packs, sold separately. The policy of Tripp Lite is one of continuous improvement. Specifications are subject to change without notice.

TRIPP·LITE
POWER PROTECTION

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